as though it were new. The performance and service life of the engine depends greatly on a careful and sensible break-in.

For the first 5-10 hours of operation, no more than one-third throttle should be used and speed should be varied as much as possible within the one-third throttle limit. Prolonged steady running at one speed, no matter how moderate, is to be avoided as well as hard acceleration.

Following the first 5-10 hours of operation more throttle should not be used until the vehicle has run for 100 hours and then it should be limited to short bursts of speed until 150 hours have been logged.

The mono-grade oils recommended for break-in and normal use provide a better bedding pattern for rings and cylinder than do multi-grade oils. As a result, piston ring and cylinder bore life are greatly increased. During this period, oil consumption will be higher than normal. It is therefore important to frequently check and correct oil level. At no time, during the break-in or later, should the oil level be allowed to drop below the bottom line on the dipstick; if the oil level is low, the oil will become overheated resulting in insufficient lubrication and increased wear.

After 10 Hours Of Operation Service

It is essential that the oil be changed and the oil filter rotor and filter screen be cleaned after the first 10 hours of operation. In addition, it is a good idea to change the oil and clean the oil filter rotor and filter screen at the completion of the 100 hours of operation to ensure that all of the particles produced during break-in are removed from the lubrication system. The small added expense may be considered a smart investment that will pay off in increased engine life.

SERVICE AND ADJUSTMENT

When the engine has been assembled and installed in the vehicle, walk around the vehicle and double check all work. Do not be in a hurry for the first ride. You have invested a lot of time, energy and money so don't waste it by forgetting some little item. *Thoroughly* check and recheck all components, systems and controls. Make sure all cables are correctly routed, adjusted and secured and all bolts and nuts are properly tightened. Position all electrical wires and connectors away from the exhaust system and control levers.

Refer to Chapter Three and perform all maintenance and lubrication procedures including all adjustments. *Do not forget to add oil to the engine.*

This little time spent will prevent a lot of frustration and save not only time but money.

Table 1 ENGINE SPECIFICATIONS

Item	Specifications	Wear limit
General		
Type	4-stroke, air-cooled, SOHC	
Number of cylinders	1	
Bore and stroke	74.0 × 65.5 mm (2.91 × 2.58 in.)	
Displacement	281.7 cc (17.2 cu. in.)	
Compression ratio	9.0 to 1	
Compression pressure (at sea level)	1,250-1,450 kPa (178-206 psi)	
Lubrication	Wet sump	
Cylinder		
Bore	74.000-74.01 mm (2.913-2.914 in.)	74.01 mm (2.914 in.)
Out of round	—	0.10 mm (0.004 in.)
Piston/cylinder clearance	0.015-0.050 mm (0.0006-0.0020 in.)	0.10 mm (0.004 in.)
Piston		
Diameter	73.960-73.985 mm (2.9118-2.9128 in.)	73.90 mm (2.909 in.)
Piston pin bore	17.002-17.008 mm (0.6694-0.6696 in.)	17.04 mm (0.671 in.)
Piston pin outer diameter	16.994-17.000 in. (0.6691-0.6693 in.)	16.96 mm (0.668 in.)
Piston-to-pin clearance	0.002-0.014 mm (0.0001-0.0006 in.)	0.02 mm (0.001 in.)
Piston rings		
Number of rings		
Compression	2	
Oil control	1	
Ring end gap		
Top	0.15-0.30 mm (0.006-0.012 in.)	0.50 mm (0.020 in.)
Second	0.25-0.40 mm (0.010-0.016 in.)	0.60 mm (0.025 in.)
Oil	0.20-0.70 mm (0.008-0.028 in.)	
Ring side clearance		
Top	0.02-0.05 mm (0.001-0.002 in.)	0.09 mm (0.004 in.)
Second	0.015-0.045 mm (0.0006-0.0018 in.)	0.09 mm (0.004 in.)
Connecting rod		
Small end inner diameter	17.016-17.034 mm (0.6699-0.6706 in.)	17.10 mm (0.673 in.)
Crankshaft		
Runout	—	0.05 mm (0.002 in.)
Connecting rod big end side clearance	0.05-0.65 mm (0.002-0.026 in.)	0.80 mm (0.032 in.)
Connecting rod big end radial clearance	0.006-0.018 mm (0.0002-0.0007 in.)	0.0580 mm (0.002 in.)

(continued)

Table 1 ENGINE SPECIFICATIONS (continued)

Item	Specifications	Wear limit
Camshaft		
Camshaft lobe height		
Intake		
1988-1990	36.133-36.143 mm (1.4226-1.4229 in.)	35.963 mm (1.4159 in.)
1991-on	35.309-35.469 mm (1.3901-1.3964 in.)	35.139 mm (1.3834 in.)
Exhaust		
1988-1990	36.003-36.013 mm (1.4174-1.4178 in.)	35.833 mm (1.4107 in.)
1991-on	35.176-35.336 mm (1.3849-1.3912 in.)	35.006 mm (1.3782 in.)
Camshaft journal outer diameter		
Right-hand	23.954-23.975 mm (0.9431-0.9439 in.)	23.90 mm (0.941 in.)
Center	23.934-23.955 mm (0.9423-0.9431 in.)	23.88 mm (0.940 in.)
Left-hand	19.954-19.975 mm (0.7856-0.7864 in.)	19.90 mm (0.783 in.)
Oil clearance		
Right-hand	0.025-0.067 mm (0.0010-0.0026 in.)	0.10 mm (0.004 in.)
Center	0.045-0.087 mm (0.0018-0.0034 in.)	0.12 mm (0.005 in.)
Left-hand	0.025-0.067 mm (0.0010-0.0026 in.)	0.10 mm (0.004 in.)
Cylinder head and cover camshaft bearing journal I.D.		
Right-hand and center	24.000-24.021 mm (0.9449-0.9457 in.)	24.05 mm (0.947 in.)
Left-hand	20.000-20.021 mm (0.7874-0.7882 in.)	20.05 mm (0.789 in.)
Valves		
Valve stem outer diameter		
Intake	5.475-5.490 mm (0.2156-0.2161 in.)	5.45 mm (0.215 in.)
Exhaust	5.455-5.470 mm (0.2148-0.2154 in.)	5.43 mm (0.214 in.)
Valve guide inner diameter		
Intake and exhaust	5.500-5.512 mm (0.2165-0.2170 in.)	5.525 mm (0.2175 in.)
Stem to guide clearance		
Intake	0.010-0.037 mm. (0.0004-0.0015 in.)	0.12 mm (0.005 in.)
Exhaust	0.030-0.057 in. (0.0012-0.0022 in.)	0.14 mm (0.006 in.)
Valve seat width		
Intake and exhaust	1.2 mm (0.05 in.)	1.5 mm (0.06 in.)
Valve springs free length (intake and exhaust)		
Inner spring	38.31 mm (1.508 in.)	35.3 mm (1.39 in.)
Outer spring	46.83 mm (1.844 in.)	43.8 mm (1.72 in.)

(continued)

Table 1 ENGINE SPECIFICATIONS (continued)

Item	Specifications	Wear limit
Rocker arm assembly		
Rocker arm bore I.D.	12.000-12.018 mm (0.4724-0.4730 in.)	12.05 mm (0.474 in.)
Rocker arm shaft O.D.	11.966-11.984 mm (0.4711-0.4718 in.)	11.92 mm (0.469 in.)
Rocker arm to shaft clearance	0.016-0.052 mm (0.0006-0.0020 in.)	0.08 mm (0.003 in.)
Primary drive gear inside diameter	27.000-27.021 mm (1.0630-1.0638 in.)	27.05 mm (1.0650 in.)
Crankshaft outside diameter (where the primary drive gear rides)	26.959-26.980 mm (1.0613-1.0622 in.)	26.93 mm (1.060 in.)

Table 2 ENGINE TIGHTENING TORQUES

Item	N•m	ft.-lb.
Engine mounting hardware		
Hanger bolts and nuts (1988-1992)		
Upper	55	40
Lower	55	40
Hanger bolts and nuts (1993-on)		
Upper	75	54
Lower	75	54
Rear through bolt and nut (upper and lower)	75	54
Gearshift lever bolt	16	12
Cylinder head cover bolts		
Flange bolts	12	9
SH bolts	10	7
Camshaft sprocket bolts	20	14
Cylinder head		
Cap nuts	40	29
Allen bolts	25	18
Camshaft chain tensioner		
Mounting bolts	10	7
Sealing bolt	10	7
Oil pump union bolt	12	9
One-way clutch Torx bolts	16	12
Alternator rotor bolt	110	80
Crankcase bolts	10	7
External oil line union bolt	12	9
Foot peg bracket bolts	33	24
Crankcase bolts	10	7